Would the many bodies with an interest in training in Britain accept such a compromise?

Government dissatisfaction with the Council for Postgraduate Medical Education for England and Wales, one of three bodies set up to coordinate training in the United Kingdom (the other two are in Scotland and Northern Ireland), has been largely the result of a lack of consensus among a group of over 40 representatives of educational interests. In any case, the Department of Health and Social Security finds it easier to take advice about careers and manpower from bodies like the Joint Consultants Committee and the BMA without consulting the council.

Today's clinical tutor needs clinical, counselling, managerial, and educational skills that were not envisaged 25 years ago. Yet he or she continues to be chosen more or less arbitrarily by the hospital's medical staff committee and requires no special credentials, even though university approval is the rule. Everyone accepts that some educational expertise is desirable—seminars on teaching the teachers are available, Dundee has a centre for education technology that is better known internationally than at home, and "nuts and bolts" courses are organised for new members by the National Association of Clinical Tutors. But as long as the job is voluntary (with a small honorarium) expecting more than token professionalism is unrealistic.

One of the clinical tutors in my region produced a list of 27 tasks that ought to be tackled by the conscientious tutor; she had the greatest difficulty in managing five or six. Surely appointments should include paid sessions, and the work probably needs five. Protests will be heard from those who are afraid of losing security of tenure—clinical tutors are normally appointed for five years—but a precedent is the appointing of consultants as managers. All that is needed is an initiative by a region that values postgraduate education.

How many do? J M O'Brien, regional medical director for East Anglia, told the conference that only two out of nine regional strategic plans and only one of 14 district plans that he had examined had a policy for postgraduate medical education. A regional medical officer once remarked to me that he regarded facilities for training doctors as no more and no less important than proper laundry services for patients. Increasingly we will have to prove to managers that money spent on education—and £2-3m a year is the sum envisaged—produces measurable benefits. We could start by examining study leave: taken up by only a few doctors, whether senior or junior, there is an outcry if budgets are threatened. Yet the money may not be going to those who would benefit the most.

Our present reliance on the drug industry for financial support has been repeatedly criticised,^{2,3} but the DHSS shows no sign of wishing to fund hospital education as it does general practice training. Now that official approval seems to have been given to continuing education for all in the health service—and with a multidisciplinary education centre on the district hospital campus—money might be forthcoming. And if the spirit of the 1960s survives doctors should be able to raise money not only for new initiatives in medical education but also for the research and education that are needed to convince our paymasters to pay up.

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Regular Review

Ivory Tower Inc: universities and the market place

RUDOLF KLEIN

Almost imperceptibly the nature of our universities is being transformed. Ideology, economics, and technology are all edging the universities into the market place. Today's successful academic is increasingly the entrepreneur maximising not necessarily profit but certainly publications and grant income. With the University Grants Committee nagging the universities into adopting performance indicators, designed to reward precisely such measures of activity, entrepreneurship is being institutionalised. Furthermore, with government funding shrinking universities themselves have little alternative but to go out to sell their services to

industry or whoever else is interested in buying. Today's model of the university is Ivory Tower Inc with vice chancellors as the head of the sales force.

The interest of a recent book by Kenney, *Biotechnology: The University-Industrial Complex*, is that it provides a case study of this development in an extreme form.¹ It is the story of the impact of biotechnology on American universities. Biotechnology is special in several ways. It developed with remarkable speed in the 1970s and opened up the promise of spectacular profits. Above all, it is a technology that has been developed almost exclusively in university laboratories. The

development has thus put a huge price tag on the ideas and techniques produced by a few academic researchers working at the frontiers of their subject.

The result, as Kenney documents, has been a blurring of the traditional frontiers between the universities and industry. On one hand, many of the academic pioneers of biotechnology have helped found commercial companies for developing biotechnology and made handsome fortunes as a result. On the other hand, many large pharmaceutical and other companies have, rather than sponsoring in house research, bought themselves into university laboratories. Universities and industry have increasingly formed partnerships; scientists have come to rely increasingly on grants from commercial companies (in some of which they themselves may have an interest, either as shareholders or consultants).

Biotechnology—money for old genes

The kind of arrangement made is illustrated by the deal between the Massachusetts General Hospital and Hoechst of Germany, which Kenney is able to examine in detail because the contract was, most unusually, published in response to congressional pressure. The contract commits the company to spending almost \$50m towards a new building. In return, Hoechst gets exclusive licences for all commercially exploitable discoveries, the right to have four of its own scientists in the laboratory, the right of first refusal for funding all projects in the department, and access to the postdoctoral and graduate researchers in the laboratory. In addition, all manuscripts must be sent to Hoechst 30 days before being submitted to a journal.

Does all this matter? And, if so, why? The question is important partly because the American experience with biotechnology is only a particularly florid example of a more general trend. But it is also a trend that is deliberately being encouraged by the present British government. From the perspective of the Thatcher administration the spectacle of the universities and industry getting into bed together is one to be welcomed: the story of biotechnology provides a model for emulation. This is how the universities show their relevance and earn their keep; this is how they contribute to the economic prosperity of the country; and this is how academics are taught what is really required from them, rather than indulging in the pursuit of their own idiosyncratic fancies.

Kenney's study, however, provides a note of caution. The book started out, I suspect, as an exercise in muck raking: it was to be a tale of corruption and exploitation. But Kenney, a professor of sociology, is too good a scholar to allow his prejudices to dictate his conclusions. And the outcome is thus a more modest analysis of the tensions and stresses within universities caused by the explosion of biotechnology and its commercial potentials: tensions and stresses which have been accentuated, not caused, by this new development and which will call into question the traditional image of academic scientists engaged in the selfless pursuit of knowledge.

The myth of the selfless pursuit of knowledge

This, as Kenney emphasises, has always been something of a myth, although a comforting one for those academics (like myself) who do not produce marketable ideas or

techniques. The myth is probably also extremely important because it provides a model that emphasises personal integrity and collegial loyalty. The fact that not all of us can live up to the image all the time does not discredit the principles—any more than the 10 commandments have been discredited by millennia of sinning. As Kenney also argues, however, the incentives introduced by the commercial exploitability of certain ideas and techniques tend to widen the gap between image and behaviour, so that in the long run maintaining the ideal model of the academic scientist may prove impossible.

Bring your own attorney

Most important perhaps, the new developments impede the free flow of information and encourage secretiveness (not for nothing did the progenitors of biotechnology—Crick and Watson—indulge in something that might well have been called industrial espionage in another sphere when working on their DNA discovery, to judge from *The Double Helix*²). Kenney tellingly quotes the advice given to members of the American Society for Microbiology by the patent attorney of a large company: "In the future when you come to scientific meetings and you are going to give a presentation, consider going to a notary public to have notarised the material you are going to present. . . ." The vision of every eminent marketable scientist having his or her own patent lawyer as a constant shadow is horrifying. Furthermore, Kenney argues, the commercial exploitability of ideas and techniques turns colleagues into competitors, breeding secrecy: "The re-direction of information flows with the objective of securing private projects is having the effect of increasing secrecy on the campus." In addition, the blurring of boundaries between universities and industry creates conflicts of interests between scientists in their dual role as academics and stakeholders in commercial undertakings. What considerations, in such circumstances, shape the research agenda? And what protection have research students got against being exploited in order to provide trained manpower for the commercial sponsors of the laboratories in which they are working?

Real live problems, or flesh creeping spectres?

The trouble about Kenney's book is that, while rightly raising all these issues, it does not help us to assess just how important they are in practice. For his study appears to be based exclusively on secondary material. It is a collage of material drawn from different kinds of sources, ranging from scientific journals to newspapers, carrying very different weight. So, for example, we do not know the impact in practice of a contract that gives a company the right to look at all papers 30 days in advance of everyone else. Does this merely delay publication by a few weeks? Or does it actually lead to censorship of information? We badly need someone to spend some time talking to scientists in their laboratories to find the answers to such questions, if we are to know whether we are dealing with real, live problems or flesh creeping spectres.

Again, there is an urgent need for more debate—and greater clarity—as to what should be worrying us. Is it the commercial exploitation of academic work? Is it the competitiveness between academics? Or is it the shaping of the research agenda by forces outside the universities and the research communities? And what is the relation between these three issues? Much of the anxiety about the "university-

industrial complex" springs, I suspect, from an underlying sense that money taints and profit corrupts. The commercial exploitation of biotechnology (or, for that matter, information technology) is perceived as a threat because it distorts the academic agenda and undermines the openness between peers by introducing the profit motive into the groves of the academe. Once academics have tasted the fruit of money they will be corrupted: original sin will have entered the academic paradise. Many of the phenomena that are supposed to result from the blurring of boundaries between business and the academic community are, however, already endemic in the latter.

Poverty corrupts, absolute poverty corrupts absolutely

We do not, for example, need to invoke the corrupting influence of money to explain the competitiveness between scientists and the resulting secrecy. The competition for the Nobel prize or for a share in a limited pool of research money may be just as ruthless and intense as competition to file and exploit a profitable patent. The search for personal honours and distinction, the exhilarating feeling of having done someone else down by publishing first or shooting holes in a rival's theories, may be just as strong a driving force—dare we admit it?—in the academic world as the search for profits in the market place, and the effects of the two sets of motives may not be nearly as different as we like to think. The assumption that pure science means pure motives is nonsense: the original sin of fierce competitiveness (and secrecy, when expedient) entered the groves of academe long before the serpent of money had exercised its supposedly corrupting role. And if anything has aggravated the problem, in Britain at any rate, it is not so much the blurring of boundaries between universities and industry as the increasing scramble for dwindling resources. Nothing corrupts like poverty, while absolute poverty corrupts absolutely when it comes to cutting each other's throats in the universities.

Consider, similarly, the question of whether it is the profit motive that distorts the academic agenda of research. Again, this notion seems to rest on the romantic assumption that research agendas develop simply in response to abstract reason cogitating on intellectual problems. That may, indeed, be one element in the process. But there are other factors at work, such as the availability of funds for different kinds of work, which may in turn reflect the current policy preoccupations of the Department of Health and Social Security (this year we are into research into the acquired immune

deficiency syndrome; next year what will it be?). If we think of academics as entrepreneurs trying to maximise the reputations of themselves and their own departments—with professors the equivalent of Marx's nineteenth century small capitalists, trying to maximise their own profits—then they are going to respond to whatever incentives are on offer, whether these are provided by commercial firms or government departments. And political expediency does not have any claim to moral superiority over the search for profits when it comes to determining research agendas. And the record of the DHSS and other government departments on restricting the right to publish and attempting to censor scientific work is not spotless.

All this is not to suggest that the issues raised by Kenney's study of biotechnology in the United States should be dismissed. On the contrary, it is to argue for taking them all the more seriously because they cannot be attributed exclusively to the specific characteristic of biotechnology that he identifies—that is, its potential for commercial exploitation. Precisely because biotechnology is only a particularly dramatic example of a more general transformation of the universities we should be alert to the possible implications. For this transformation reflects not just a blurring of boundaries between university and industry but also between the academic and the public domain.

Academic policy, as we know all too well in Britain, is now public policy—inevitably so given the costs, but carrying the risk that the evanescent views and prejudices of transient politicians will shape the future of the universities for decades to come. The idea of intellectual inquiry being its own justification and reward cannot be expected to survive into an era where the size of budgets makes it inevitable that researchers will be asked to account for themselves, whether to governmental or commercial sponsors. Our trouble is that as yet we have not worked out a formula that will safeguard freedom without sheltering mediocrity and that will reflect the reality of academic entrepreneurship while also recognising the value of the traditional, if often mythical, academic virtues.

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2 Watson JD. *The double helix*. Harmondsworth: Penguin, 1970.